The "Realist Search": a systematic scoping review of current practice and reporting

Andrew Booth[1], Simon Briscoe[2], Judy M Wright[3]

1 University of Sheffield, School of Health and Related Research (ScHARR), Regent Court, 30 Regent Street, Sheffield, UK, S1 4DA

2 Exeter HS&DR Evidence Synthesis Centre, Institute of Health Research, College of Medicine and Health, University of Exeter, UK
3 Academic Unit of Health Economics, Leeds Institute of Health Science, University of Leeds, UK

Correspondence
Andrew Booth, University of Sheffield, School of Health and Related Research (ScHARR), Regent Court, 30 Regent Street, Sheffield, UK, S1 4DA
Email: A.Booth@sheffield.ac.uk

Abstract

The requirement that literature searches that identify studies for inclusion in systematic reviews should be systematic, explicit and reproducible extends, at least by implication, to other types of literature review. However, realist reviews commonly require literature searches which challenge systematic reporting; searches are iterative and involve multiple search strategies and approaches. Notwithstanding these challenges, reporting of the "realist search" can be structured to be transparent and to facilitate identification of innovative retrieval practices. Our six-component search framework, consolidates and extends the structure advanced by Pawson, one of the originators of realist review: formulating the question, conducting the background search, searching for programme theory, searching for empirical studies, searching to refine programme theory and identify relevant mid-range theory, and documenting and reporting the search process. This study reviews reports of search methods in 34 realist reviews published within the calendar year of 2016. Data from all eligible reviews were extracted against the search framework. Realist search reports poorly differentiate between the different search components. Review teams often conduct a single "big bang" multi-purpose search to fulfil multiple functions within the review. However, it is acknowledged that realist searches are likely to be iterative and responsive to emergent data. Overall the search for empirical studies appears most comprehensive in conduct and reporting detail. In contrast, searches to identify and refine programme theory are poorly conducted, if at all, and poorly reported. Use of this

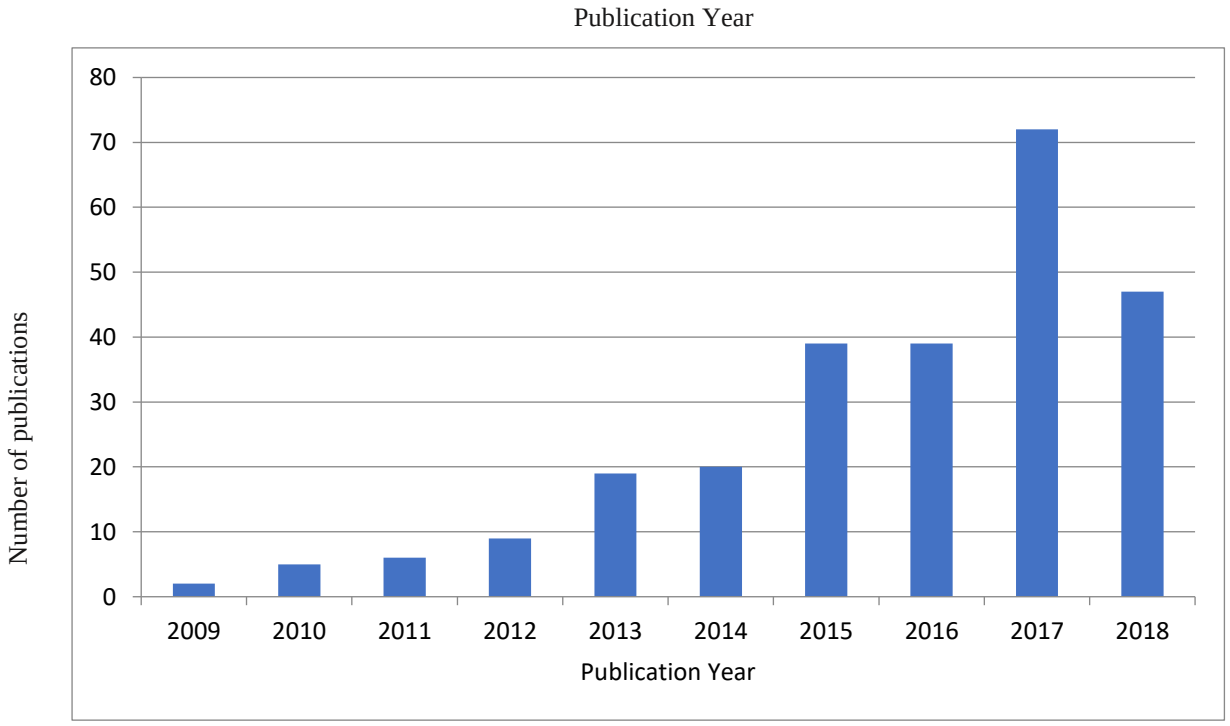
framework offers greater transparency in conduct and reporting while preserving flexibility and methodological innovation.

KEYWORDS
realist synthesis, literature searches, reporting standards

1 INTRODUCTION

Realist synthesis has witnessed a dramatic and sustained rise in popularity since first being advanced in 2004.[1] A search in Web of Science Core Collection (1900 – 2019) for publications with 'Realist Synthesis' or 'Realist Review' in the title revealed growth from 2 studies published in 2009 to a peak, so far, of 72 studies (2017), before falling slightly to 47 studies (2018) (see Figure 1).

Figure 1 - Number of realist synthesis publications in Web of Science Core Collection



This popularity may be attributed to the familiarity and accessibility of the mantra "what works for whom under what circumstances", successfully appropriated by realist synthesis advocates

although equally a line of inquiry for other forms of evidence synthesis. Methods for systematic reviews of effectiveness hold limited capacity to gather and analyse evidence on why and when interventions are effective. Realist syntheses address this challenge. Realist synthesis has been further popularised through production of the RAMESES training materials and reporting standards,[2] by an active programme of conferences and training events and, in July 2018, through the first edited collection on *Doing Realist Research.*[3] Uptake of realist approaches has been prolific within the UK National Institute of Health Research (NIHR) funding programme, particularly within research programmes that are characterised by complex questions associated with complex interventions being explored within complex adaptive systems.

As with other approaches to mixed methods synthesis, realist synthesis has faced challenges associated with the need to develop explicit and transparent methods. Early writings on realist synthesis were never intended as methodological guidebooks. While freedom to interpret existing methods, and thus to develop new responses, offers potential innovation, a lack of clarity persists around the key stages of the realist synthesis process.[4] Nowhere is this lack of clarity more apparent than in connection with the "realist search"; systematic review reporting guidelines cultivate an expectation for systematic, explicit and reproducible search processes. By contrast, realist inquiry remains inherently intuitive and iterative posing a challenge to sequential reporting. While this challenge is acknowledged and is being tackled for other evidence syntheses, such as systematic reviews of qualitative research, our collective experience suggests that realist reviews probably represent the most extreme position on this continuum.

The objective of this study is to examine current methodological practice as captured in a sample of realist reviews (i.e. the outputs of realist synthesis) published in 2016 with respect to searches used to identify programme theories and studies for inclusion.

Box 1 - Glossary for Realist Approaches

Glossary for Realist Approaches

Realist Review – a review presenting evidence from diverse sources, selected according to relevance and rigour, to explore how a complex intervention works, for whom and under what circumstances.

"Realist Search" – a preferred label that describes all procedures used to identify documents for inclusion in a realist review, often as a counterpoint to a "Systematic Review Search". The search is not itself required to be 'realist'.

Realist Synthesis – term often used synonymously for realist review but also to refer to a synthesis method for studying complex interventions in response to perceived limitations of systematic review methodology. It involves identification of contexts, mechanisms and outcomes for interventions or programmes to explain the differences, intended or unintended, between them.

Context-Intervention-Mechanisms-Outcome (CIMO) – a way of structuring a realist review question, comparable to PICO for a systematic review, that formulates the question in terms of Where? By what? By what means? And with what effect?

Mechanism – an interaction of the reasoning and reactions of individuals/collective agent(s), activated by resources available in a given context, to achieve changes through implementation of an intervention.

Mid-range (or Middle-range) Theory – a theory that goes beyond the theory of change for a specific project or programme to explain how a group of similar interventions or programmes activate similar mechanisms in order to achieve change.

Programme Theory – explanations for how a specific intervention or programme is thought to work (also known as a "theory of change")

RAMESES (Realist And MEta-narrative Evidence Syntheses: Evolving Standards) – reporting standards for realist syntheses, comparable to PRISMA for systematic reviews and meta-analyses.

BACKGROUND

1.1 The six components of the realist search

As information specialists, collectively associated with diverse realist syntheses, we have documented different approaches to the realist search and have identified a need to map the search process to the realist synthesis template proposed by Pawson. We have previously specified six components of the realist search:[5]

1. Formulating the Question[6]
2. Conducting the Background Search[7]
3. Searching for Programme Theories[7]
4. Searching for Empirical Evidence[7]
5. Searching to Refine Programme Theories[8]
6. Documenting the Search Process[2]

Working within this six-component framework we identified techniques and procedures to contribute to the specific objectives of each component. These included search methods for retrieving non-research materials,[5] for identifying "sibling" or associated papers around a particular index study[9] and for identifying explicit mention of theory.[10] However, we anticipated that our proposed methods would be strengthened by considering innovative approaches used by our contemporaries. We therefore undertook an audit of realist search methods used within a sample of published realist reviews.

A previous audit of current practice in realist synthesis reviewed 54 realist reviews published between 2004 and January 2015.[4] The analysis, structured around the RAMESES Reporting Standards,[2] included only three elements that relate to the realist search. Four reviews were excluded as they re-analysed materials from a pre-existing systematic review. Assessing the resultant sample against Item 7 of the RAMESES Reporting Standards,[2] *Scoping the Literature*, the authors found that only 18 adequately described and justified the initial process of exploratory scoping of the literature. Forty-seven of the 50 eligible realist reviews performed well against Item 8, *the Searching Process*, in that they both stated and provided a rationale for how the iterative searching was done, together with details on all the sources accessed for information in the review. Finally, item 17 *Comparison with existing literature*, which requires a comparison and contrast of findings with existing literature on the same topic was fulfilled in 19 reviews, not met in 27 reviews and partially met in a further eight.

While collectively welcoming inclusion of search methods in the previous audit[4] we feel that further analysis is required if information specialists and review teams are to develop explicit and transparent methods for the realist search. In addition, the pace of rapid development of realist methods suggests that it is important to review a recent sample of published reports.

1.2 Why this study is needed

No published formal guidance exists on the conduct of literature searches to support the realist synthesis process. Three standards do exist for reporting of realist searches within the RAMESES reporting standards.[2] However, these standards do not distinguish between the different stages of a realist synthesis and typically lead to a single multi-purpose search or to search stages that are indistinct and difficult to characterise. In a recent multi-authored work we have outlined a six-component realist search process that we believe will assist review authors and information specialists to conduct systematic searches.[5] We deliberately present this as a framework, rather than a template (breaking with Pawson's convention), and as components (rather than stages) to emphasise the flexibility already present for both procedures and sequencing. Reviewing reports of realist searches enables us to assess the state of current practice and to make recommendations to improve practice if required. Doing this retrospectively in this first instance, while not seeking to impose standards post hoc, offers a potential benchmark against which future progress in reporting may subsequently be assessed.

2 METHODS

This systematic scoping review is a selective update of a previous study[4]. We followed the recognised five stages of a scoping review[11], as cited in the previous study[4], to undertake our own systematic scoping review of the search methods reported in realist reviews published within the calendar year of 2016:

1. Identify the research question
2. Identify relevant studies
3. Select studies
4. Chart the data
5. Collate, summarize, and report the results.

2.1 Inclusion and exclusion criteria

To be included in our systematic scoping review a review had to meet the following criteria:

a) Include a realist component as part of the evidence synthesis methodology, i.e. either as a stand-alone realist review or as a mixed-methods review that incorporates a realist synthesis;

b) Describe the search to identify studies and/or other types of literature for inclusion in the review;

c) Published in English;

d) Published within the calendar year 2016, either in a journal issue, 'early view' online only publication or academic thesis.

Non-English language realist reviews were excluded due to lack of translation resources. Monographs such as books and book chapters were excluded except for publications in the NIHR monograph series, a hybrid monograph/journal publication. Conference abstracts for realist or mixed methods reviews were also excluded being unlikely to contain a detailed report of the search methods. Having originally searched for realist and mixed methods reviews with a realist component published between 2015 and July 2017, we subsequently restricted our dataset to a sufficiently rich sample of articles published in 2016 to best manage and analyse the results of our search within the available time and resources. (See Appendix 3 for Excluded Studies)

2.2 Search to identify relevant realist and mixed methods reviews

We (AB, SB, JW) updated the bibliographic database searches from the previous audit[4] in July 2017, replicating both search terms and databases reported. One minor variation was that we searched MEDLINE via PubMed rather than via the Ovid platform. Berg & Nanavati (2016) selected search terms empirically derived from realist reviews known to them at the outset of the review and tested the resulting search strategy to ensure that all known reviews were retrieved.[4] Bibliographic databases searched include: CINAHL (via EBSCO); the Cochrane Database of Systematic reviews (via the Cochrane Library); DARE (via the Centre for Reviews and Dissemination); Embase (via Ovid); ERIC (via EBSCO); MEDLINE (via PubMed); ProQuest Dissertations and Theses; PsycINFO (via Ovid); Social Services Abstracts (via ProQuest); Sociological Abstracts (via ProQuest); and Web of Science Core Collection (via Clarivate Analytics). Search results were limited to the calendar year of 2016, to provide a standardised unit for analysis, although studies published during this period could have been conducted over different time intervals. All search results were exported to EndNote X7 (Clarivate Analytics) and de-duplicated. Search strategies for each database and the number of hits retrieved are reported in Appendix 1.

Also following the previous audit,[4] forward citation searching was undertaken using Google Scholar, accessed via the Publish or Perish software, using key realist methodological texts as

source studies.[1 2 10-12] Results were exported to EndNote X7 and de-duplicated against the bibliographic database search results.

2.3 Selection of relevant reviews

AB screened the titles and abstracts of all search results to identify relevant realist and mixed methods reviews including a realist component. Following post-hoc application of the 2016 date limit (see above), we (AB, SB, JW) retrieved full-text copies of all relevant reviews published in 2016. Full text screening to assess eligibility of reviews for inclusion in our review was undertaken once reviews had been assigned to reviewers (AB, SB, JW) for data extraction.

2.4 Data extraction

AB designed the data-extraction form using Google Forms and all three authors piloted it. Reviews meeting our inclusion criteria at title and abstract were divided equally between the three authors. The data extraction form was structured around our previously-presented six-component framework for the realist search.[5] This includes four separate search components, including 'background searches', 'searches to identify programme theory', 'searches to identify empirical evidence' and 'searches to refine the programme theory', prefaced by 'focusing the question' and followed by 'search documentation'.[5] The data extraction form captured data on the overall approach for each stage together with specific detail on: the bibliographic databases searched, any non-bibliographic database search methods, the sampling strategy, and the type of studies included. The data extraction form is reproduced in Appendix 2.

Where the description of the search methods could not be mapped to the four components on the data extraction form,[3] data were copied and pasted into the most appropriate free-text boxes to avoid loss of data about search methods.

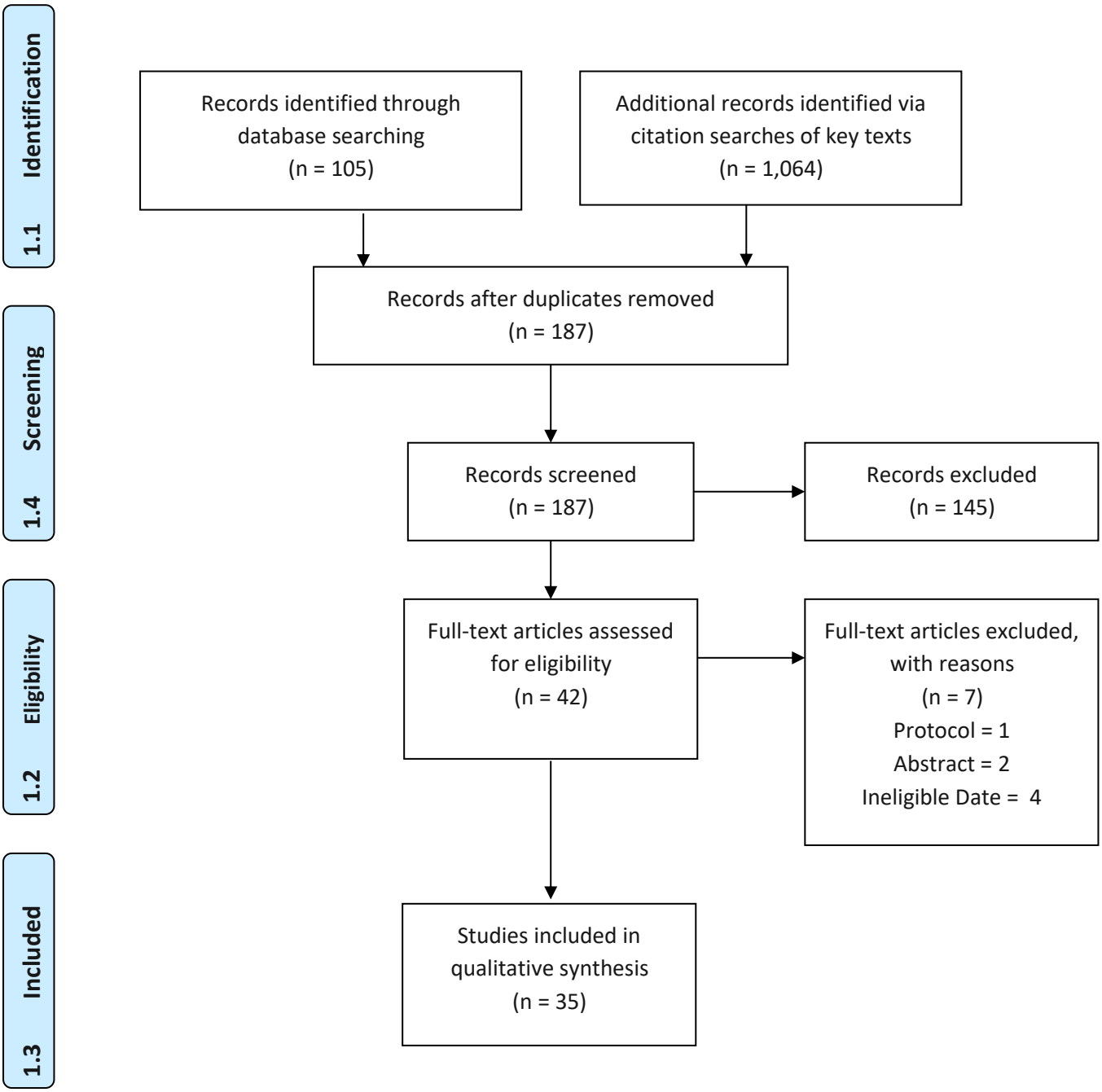
2.5 Data analysis

Data extraction form responses were collated in a table (spreadsheet) where each row contained data for a study and data extraction items were organised in columns. Analysis was divided between all authors, each summarising data for multiple data items. Categorical data such as responses for 'tick box' questions were summed to give an overall numerical result, e.g. the number of studies reporting a 'background search'. Free text responses were collated and summarised, thematically where possible.

3 RESULTS

We initially identified 187 records of realist syntheses published between 2015-2017 from the formal search strategy and Google Scholar citation searches (Figure 2). Realist review protocols were subsequently excluded as they represented planned, not actual practice. We subsequently applied strict date criteria relating to print and electronic publication of articles to restrict our data set to studies first published in 2016.

Figure 2 - PRISMA Flow Diagram



3.1 Overview of the included studies

We included a total of 35 studies in our sample.[15-49] Most papers reported a single realist review (27 of 35). Fewer papers reported a multi-component review which include a realist review component (n = 5)[18,24,36,41,47] or a rapid realist review (n = 3).[26,42,44] We identified different models of searching from examining the overall purpose and scope of the reported searches (Table 1). The most common model (n = 25) was where realist reviews reported the realist search as the exclusive search, i.e. all the searches reported had the sole purpose of gathering evidence for the realist synthesis. Four adopted what we label a 'mushroom' approach whereby a general search was conducted first (mushroom cap) and then a separate realist search (or searches) (mushroom stalk) was undertaken[26-27,29,43] e.g. one realist review drew from studies previously included and excluded from a linked systematic review and conducted citation chaining to identify further studies to support the realist analysis.[29] In this example, results found for the earlier systematic review represent the mushroom cap and later citation chaining searches to support the realist analysis constitute the mushroom stalk. A third 'pick and place' model (from the analogy of an assembly line) emerged in six reviews[18,20,36,41,47,49] where a search produced a large set of results from which the research team 'picked' different study types and then 'placed' them for inclusion within different aspects of a review. In this model, a separate realist search was not reported and the reviewers gathered studies to inform the realist synthesis from the large, multipurpose search. A Health Technology Assessment report[41] illustrates how a single search, designed to retrieve studies for an evidence mapping exercise, 'picked' studies to be 'placed' in a systematic review of costs and effectiveness or in the realist synthesis. Studies for this realist synthesis were 'picked' from this large set of search results without undertaking a separate search.

Table 1 - Realist Search Approaches

Search Model	*Number of Reviews*
Exclusive (Realist-only) searches - *Search conducted exclusively to inform the realist synthesis*	*25*
Mushroom/staged searches - *A generic topic-based multipurpose search (cap) followed by a targeted search(es) (stalk) exclusively to inform the realist synthesis*	*4*
Pick and place approach - *Single comprehensive multi-domain search from which different studies are picked for different components (e.g. effectiveness, cost effectiveness, acceptability etc) of a review (including for the realist synthesis) and placed in results sets for subsequent processing.*	*6*

3.2 Structure of the review team and number of authors

Four of 35 reviews in our sample were conducted by one author; 15 reviews were carried out by 2-5 authors; 11 reviews by 6-9 authors; and 5 reviews by 10 or more authors. These results appear similar to a seminal epidemiological study of systematic reviews which identified a median of 5 authors (IQR 4-6) per review in a cross-sectional sample of 300 systematic reviews.[50] However we are unable to compare our data directly with the range of values captured in this previous study. Most reviews (n=25) described the roles and responsibilities of review team members, variously reported as listings of professional titles through to crediting team members with particular tasks. The remaining 10 reviews provided selected team member roles or no details about team member roles. Four of these reviews involved only one author, whom we assume undertook all tasks.

3.3 Information specialist involvement

Three reviews explicitly credited an information specialist with authorship.[26 36 47] In one review the information specialist was credited with carrying out the searches[26] and in one review the information specialist provided advice on carrying out the searches.[47] No information was given about the involvement of the information specialist in the third review.[36] A further 12 reviews mentioned an information specialist in either the main text or

in the acknowledgements section but not as an author. In these examples, the input of the information specialist was not significantly different to where they were explicitly credited with authorship: information specialist input ranged from providing advice on searching through to designing and carrying out the search. The remaining 20 reviews did not explicitly credit an information specialist as an author or acknowledge them elsewhere in the text. However, this may reflect non-reporting rather than non-involvement.

3.4 Sampling Approaches

The persistence of the comprehensive sampling approach was clearly evidenced in the study sample. Twenty-six of the included reviews described using a comprehensive search, either as the main search strategy or as a principal component alongside other sampling approaches. This finding was not unexpected, particularly with respect to the search for empirical evidence, the realist search component that most closely conforms to the typical systematic review search template. Even purposive sampling approaches may require construction of an initial comprehensive sampling frame before pursuing strategies informed by this ‘map’ of an overall research area. Realist searches for the remaining reviews in the sample displayed diverse sampling strategies, including the following:

Convenience sample

Realist synthesis methods are occasionally used to add enhanced analysis to a dataset of previously identified studies. So, a realist review of pharmacist-led smoking cessation support describes using pre-existing empirical evidence to populate the review.[29]

Maximum Variation sample

Specifically, at the stage of theory testing, a review team may seek a maximum variation (or maximum variety) sample to identify features associated with a successful or unsuccessful programme. In practical terms, however, this may involve undertaking a comprehensive search and then mapping retrieved studies against variables to identify maximum variation. So, a realist review of music therapy for palliative care describes undertaking "comprehensive purposive searching to arrive at a 'maximum variety sample' that could sufficiently test our theories".[35]

Snowball sample

Six of the reviews in our sample described use of snowball sampling. Snowball sampling can be achieved by following up the citations of a highly relevant study forwards to find subsequently-published relevant studies, and then following up the citations of those newly

found relevant studies, and so on. Within realist syntheses snowball sampling has two particular uses – first, for poorly defined concepts with disparate keywords it offers an additional access point to the literature as an alternative to subject based searching. Second, snowball sampling can help in identifying chains or clusters of related references associated with a single project.[9] Whitaker and colleagues describe seeking "evidence clusters" associated with the implementation or acceptability of interventions related to key randomised controlled trials.[47] However, the success of this strategy was limited by a shortage of UK-based index studies from which to grow the evidence clusters.

Purposive and theoretical sampling

Purposive approaches to sampling focus the precision of the search to yield literature with a high degree of relevance to the research question. Eight reviews in our sample reported such an approach purposively selecting key (as defined by the review teams) relevant documents as starting points for identifying further documents of interest via citation searching. Berge reported carrying out three separate searches in an iterative attempt to gradually refine their literature base to match the focus of the research question.[17] Berge's approach combined elements of comprehensive sampling, with respect to the number of sources searched, with a subsequent purposive stage when refining the literature base.

Theoretical sample

One realist review cites theoretical sampling, stating that the team achieved "theoretical saturation" from their initial comprehensive search.[23] Theoretical sampling in synthesis shares with primary qualitative data collection challenges in how authors define 'saturation' and in how to demonstrate achievement of this state.

Overall, the descriptions of sampling strategies revealed a lack of clarity. This was a natural consequence of the failure by most realist review reports to differentiate between the four principal realist search components. We contend that specifying the four search components separately, together with the sampling strategy associated with each particular component would provide a clear and consistent description of methods.

We next examined how the individual realist reviews performed against the first five components of a realist search (Table 2). The sixth component, reporting and documentation, is discussed narratively in a subsequent section of this article.

Table 2 - Reporting of Realist Search Components

Study ID	*Formulating the Question*	*Background Search*	*Programme Theory Search*	*Search for Empirical Evidence*	*Refining Programme Theories*
Apollonio 2016[15]	No	No	No	Yes	No
Baker 2016[16]	No	Yes	Yes	Yes	No
Berge 2016[17]	No	No	Yes	Yes	Yes
Brown 2016[18]	No	No	No	No	No
Camprubi 2016[19]	No	No	Yes	Yes	No
Charles 2016[20]	No	Yes	No	Multipurpose	No
Cunningham 2016[21]	No	Yes	No	Yes	Yes
De Souza 2016[22]	No	No	No	Multipurpose	No
Elliott 2016[23]	No	Yes	No	Yes	No
Ellwood 2016[24]	CIMO	No	No	Yes	No
Ford 2016[25]	No	Yes	Yes	Multipurpose	No
Gee 2017[26]	No	No	Yes	Multipurpose	No
Gilmer 2016[27]	No	Yes	Yes	Multipurpose	No
Goodman 2016[28]	No	Yes	Yes	Yes	No
Greenhalgh 2016[29]	No	Yes	Yes	Multipurpose	Yes
Kehoe 2016[30]	No	No	Yes	Yes	Yes
Kornelson 2016a[31]	No	No	No	Yes	No
Kornelson 2016b[32]	No	No	No	Yes	No
Lindsey 2016[33]	No	No	Yes	Yes	No
Lodenstein 2017[34]	No	Yes	No	Yes	No
McConnell 2017[35]	No	No	Yes	Multipurpose	Yes

McLean 2016[36]	No	No	No	Multipurpose	No
McNeil 2016[37]	No	Yes	Yes	Yes	No
McVeigh 2016[38]	No	Yes	No	Yes	No
Mogre 2016[39]	No	No	Yes	Multipurpose	No
Nilsson 2016[40]	No	Yes	Yes	Multipurpose	No
Nyssen 2016[41]	PICO	No	Yes	Multipurpose	No
Parkinson 2016[42]	No	Yes	Yes	Multipurpose	No
Smylie 2016[43]	No	No	Yes	Multipurpose	Yes
Tsang 2016[44]	No	No	No	No	No
van Hooft 2016[45]	No	No	No	Yes	No
Watkins 2016[46]	No	Unclear	No	Yes	Yes
Whitaker 2016[47]	PICO	Yes	Yes	Multipurpose	No
Williams 2016[48]	No	Yes	Yes	Yes	Yes
Willis 2016[49]	Concepts only	Yes	Yes	Multipurpose	No

3.5 Formulating the Question

Systematic review conventions, in health care, management and many other fields, assert the importance of formulating a question both to specify the scope of the topic being explored and to inform subsequent inclusion and exclusion criteria and data extraction. Question formulation also helps the searcher to identify suitable components for use in the bibliographic database search strategy. Within health care the Population-Intervention-Comparison-Outcome (PICO) formulation holds ascendancy, particularly for Intervention-based questions. Other question formulations, such as Context-Intervention-Mechanism(s)-Outcome, have been proposed as more suited to realist review questions.[5]

We found little evidence of structured question formulation within the sample of realist reviews. Thirty-two of the included reviews had no specific question formulation. Only two reviews used the PICO formulation[41,47] although this information may be contained elsewhere in a published protocol document. One review used the principles of question

formulation, specifying Concept 1, Concept 2, Concept 3 etc, without invoking a specific formulation.[49] The final example[24] used the Context-Intervention-Mechanisms-Outcome (CIMO) formulation[6] which, ostensibly, offers the closest match to the terminology of realist synthesis. The RAMESES reporting standards include a criterion related to development of an appropriate research question;[2] suggesting that the familiar "for whom, in what contexts...etc" should be used to structure research questions. This may represent an appropriate standard to apply to reviews in our sample.

3.6 Conducting the Background Search

A Background Search is considered an important component of the exploratory realist process and serves to sensitise the review team to the available literature. This search was variously labelled a "background search",[48,49] which suggests sensitisation to the literature, or a "scoping search",[38,42,46] which conveys a logistic function. However, we could not detect any consistency in the differential use of these terms with both purposes being important at this stage of the search process:

> "The purpose of this initial search was twofold; to ascertain that there was sufficient breadth and depth of available evidence…on which to base the review, and to begin to identify papers which could firm up the nascent theories about what the mechanisms of the programme might be".[21]

Seventeen of the included reviews did not report any process for a Background Search. Numerous diverse strategies were reported within the remaining papers:

- Starting from existing review or primary literature[47]
- Preliminary broad concept search of one or more targeted databases for reviews[49]
- Web search using Google Scholar[42]
- Search for policy documents or other grey literature[25]
- Searches for recurrent authors[40]
- Website searches of relevant organisations[25]

In other cases, review teams engaged with stakeholders,[32] requesting relevant documents, either as an alternative, or to supplement a broad literature search.

3.7 Searching for Programme Theories

The formal search for programme theory is only one of several possible routes for identifying programme theories alongside such methods as consultation with stakeholders and review of unpublished programme descriptions. Nevertheless, assuming a review team decides that they

will undertake a formal search, this need not automatically assume a subordinate role in the development of programme theories.

Results from the "scoping" or "background" searches, including both academic and grey literature, may serve a dual purpose in contributing to emerging programme theory. This publicly available data, alongside input from external experts may contribute to the initial programme theory.[34] Other sources include policy documents while the research team themselves are often involved in generating the initial programme theory. Typically, creation of initial programme theory leads to subsequent searches for specific aspects of the programme theory, broken down into main concepts.[5]

Given that realist synthesis and realist evaluation are increasingly being harnessed in conjunction it is unsurprising to see evidence strands from literature, policy documents and stakeholders being increasingly interwoven. Pawson attests to the value of comparing "official expectations with actual practice".[14] Some realist projects sought to identify all relevant literature *a priori* and then to identify programme theory from a conceptually-rich subset of the total literature set.[47]

Few review teams reported systematic approaches to searching for theory.[29,49] More typically theory was identified serendipitously from the Background/Scoping Searches or from a comprehensive Search for Empirical Evidence. One team found that items excluded from a review of quantitative findings were particularly relevant for theory building as well as supplying important contextual detail.[29] They describe using 'citation-based search methods' to identify key papers and reviews. These methods included citation chaining (backwards inspection of reference lists and Google Scholar forward tracking) and the 'Related Citations' function on PubMed for titles of studies matched to an index paper using the database algorithm.

A notable exception to the serendipitous approach involved using the strategy "framework/model/theory/concept" with terms used to indicate large-scale organizational change.[49] The strategy does not acknowledge published methods for searching for theory but, nevertheless corresponds to these suggestions.[10] In fact the same review was the only one to include an Appendix entitled: Search strategy for developing the programme theory.[49]

3.8 Search for Empirical Evidence

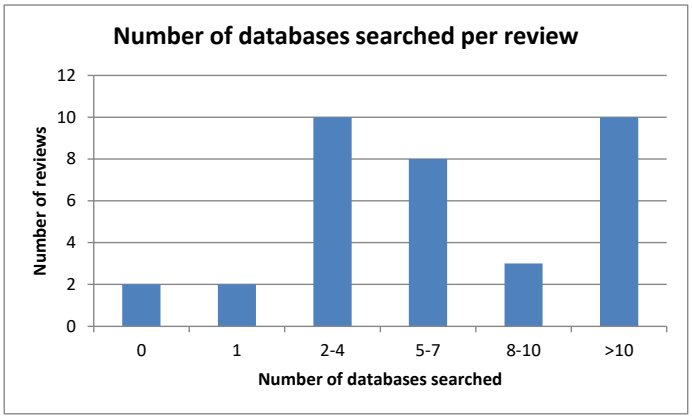
The search methods used for finding empirical evidence were described in more detail than other elements of the realist search. Searches were reported similarly to conventional systematic review searches with (for most reviews) details about the database searched, search terms used and date of search. The Empirical Evidence Search has largely the same aim as a conventional systematic review search to identify evidence that tests either a theory or an intervention, differing in that a comprehensive search is not a prerequisite of a realist review. This similarity probably reflects review team familiarity with well-established search methods and reporting requirements for empirical evidence in conventional systematic reviews as well as shared expectations cultivated by the content of the RAMESES reporting standards.[2]

Total number of databases searched

The number of databases searched for a review is influenced by the databases available to the review team, the discipline(s) covered by the review question, the study and publication types under review and the time and experience of the searcher. We would expect more than one database to be searched for a systematic review or realist synthesis to minimise publication bias. It is difficult to determine any pattern from our results since the realist syntheses we evaluated spanned diverse disciplines and searched for different publication types. The results indicate a broadly similar number of databases searched across the realist reviews, when compared to a conventional systematic review. An analysis of 300 systematic reviews reported a median of 4 (IQR 3-5) databases searched for systematic reviews,[50] and as Figure 3 reveals, searches of either 2-7 or over 10 databases were most common for our realist review sample. We were unable to distinguish any differences in database numbers for rapid realist reviews or realist review-only types of paper. Of three rapid reviews assessed,[26,42,44] one searched 2-4, one searched 5-7 and the other 8-10 databases. Fifteen of the 27 realist review-only papers searched 2-7 databases. Four of the five multi-component reviews searched over 10 databases, though the remaining one searched 2-4 databases. Multi-component reviews could be expected to search a large number of databases if the aim was to identify evidence relevant for several review components covering different types of evidence or data. For example, clinical trials, guidelines, theses, trade articles and research articles are accessible from different databases including ClinicalTrials.gov, HMIC, SCIE, ProQuest Dissertations and Theses, ABI/INFORM and Web of Science. Furthermore, we would expect a higher number of databases to be searched where the review question straddles several disciplines - a question on the implementation and use of electronic health

records could draw on health, computer science, management science and psychology literatures.

Figure 3 - Number of databases searched per review



For two reviews it was impossible for us to determine from the reports if any databases were searched. One reported sourcing reports from a University digital repository[22] while the other sourced reports from websites, personal knowledge and reference tracking.[33] It is unclear if these activities involved browsing, retrieving known items or conducting a structured search. Two reviews reported searching only one database,[19,29] although one of these indicated that a larger set of 7 databases was searched for a separate review component reported elsewhere but which subsequently contributed data to the realist review.[29]

Main databases searched

Table 3 - Number of reviews searching specific and grouped database

Database	*No. of reviews searching the database(s)*
MEDLINE	*27*
EMBASE	*19*
CINAHL	*18*
PsycINFO	*15*
Cochrane Library	*13*
Web of Knowledge	*13*
SSCI	*2*
SCI	*1*
SCOPUS	*12*
Other non-health discipline specific databases	*21*
Other medicine/health databases	*10*
Other general database	*8*
Other	*0*

No specific databases figured prominently across all reviews although, as Table 3 indicates, the health databases were most frequently utilised. This dominance of health databases was expected since 31 of the 35 reviews covered health-related questions. The majority of health-related reviews had searched MEDLINE (n=27), followed by EMBASE (n=19) and CINAHL (n=18). Of the four non-health reviews, two searched general databases and non-health discipline specific databases,[24,40] and two did not report searching databases.[22,33]

Realist reviews sometimes 'borrow' evidence from other disciplines to support or refute a programme theory. Searching information resources for evidence from related disciplines is evidenced with most of our sample searching diverse discipline-specific and multi-disciplinary databases. Twenty six of the 31

health reviews reported searching non-health discipline-specific databases (n=5) such as ASSIA, Engineering Village and ERIC, multi-disciplinary databases (n=7) such as Web of Knowledge, or both (n=14). Three health reviews did not search any health discipline databases,[17,19,42] but relied on multi-disciplinary databases for health studies and, presumably, relevant studies from other disciplines. Five health reviews searched only health databases.[16,25,29,35,44]

Health databases that fell under our data category 'Other medicine/health databases' included global health, ongoing research, healthcare condition and healthcare professional specific databases, chosen for relevance to the review question. For example, a review of rehabilitation included database searches of Rehabdata and the CIRRIE Database of International Rehabilitation Research.[38]

Twenty-two reviews searched at least one multidisciplinary database (Scopus, Web of Knowledge, Social Science Citation Index and Science Citation Index). Six reviews named various sources classed as 'Other general / multidisciplinary sources' including a University research articles database, grey literature e.g. OpenGrey, Dissertation Abstracts, Inside Conferences, and journal articles e.g. ScienceDirect.

Thirteen reviews reported searching within a search engine, including eight reviews that reported a Google search, two reviews that reported a Google Scholar search and three that reported searching both Google and Google Scholar.

Date coverage

Twenty-one reviews reported either a start date, an end date or both to describe the date coverage of the searches. Just over a third (13 reviews) gave justifications for their start dates or end dates or both. Justifications included identifying publications after landmark policies or guidelines were introduced, rapid review considerations, an aim to focus on recent publications and starting from a date when relevant publications gained prominence in the literature. One review selected a start date for their final search by identifying when a trend of increased relevant publications began from initial search results.[38]

Limits

Although reporting the use of limits (other than date limits) within a search is not required by RAMESES publication standards[2] we included it in our data extraction to identify the types of limits used and justifications for using them in the context of realist reviews. Twenty-one reviews did not report using limits (other than date limits). A single limit was reported in 12 reviews, and two reviews reported multiple limits.[15,17] English language was the search limit used most frequently (n = 12). Other

limits included geographic search filters and limiting to peer-reviewed publications. Some reviews reported using a limit for searches for one component e.g. Background Search but not another. Geographic searches were used to limit search results to studies from particular entities e.g. low-income countries. However, in a review which focussed on less resourced settings,[38] studies from high income countries were identified where findings could be adapted to low-income countries. Geographic filters may be appropriate but should be used with caution within realist reviews where studies based in different geographic contexts may offer valuable insights.

3.9 Searching to Refine Programme Theories

A notable omission from the majority of realist search descriptions were details of specific searches to refine programme theories. This may reflect that the search to refine programme theories is pervasive throughout the course of the review or, more simply, that it is particularly challenging to document this fact. Most included reviews indicated some additional activity but typically described in general terms and in the perfunctory detail of a couple of sentences of description. Others used the results of an earlier search, the background search or the search for empirical evidence as a source to refine programme theories. Many review teams chose to describe the dual process of developing an initial programme theory and subsequent refinement as continuous, rather than as two discrete stages. This is confirmed by an emphasis on searches conducted "throughout the project" – suggesting follow up of theory leads. One realist review describes how this iterative process would work "as new elements of theory were developed from the data, secondary searches for evidence to support and refine those elements were required".[30]

This review also described the creation of case studies as a way of exploring theory refinement (describing this as a "reality check"). Key to this stage of the process is the need to look for the disconfirming case[51] – indeed one review described the need to revisit previously excluded studies specifically for this purpose.[29]

Searching for Mid-Range Theories

We observed a comparable lack of description of how searches had been used in connection with identification of mid-range theories. In some cases the review team seems to have centred on a specific theory early in the process and then to use this as a 'lens' through which to explore the collected data.[17,25] In other cases the review team gathered together a host of frameworks, from different disciplines and contexts, and explored the utility of each.[23] Some programmes were explicitly based on underpinning theoretical frameworks in which case the review team could establish a strong link

between the programme theory and mid-range theory. However, notwithstanding this apparent richness of explicit theorising the same team observed that a large proportion of the remaining programmes "appeared to be atheoretical or chose not to discuss their theoretical underpinnings".[27]

The process which we expected to see, based on realist methods texts,[8] was most closely approximated in a review of care homes for older people.[28] After producing a set of potential context, mechanism and outcome configurations the team conducted more detailed searches of the literature that revisited and expanded the searches from Stage 1. Subsequently they "considered interventions that drew on theories that focused on: the assessment of frail older people in the last years of life; system driven quality improvement schemes in primary care; and theories of integrated working".[28] Even here, however, the team does not explain how they identified, and then selected, the candidate theories that they subsequently pursued.

Once mid-range theories are identified the review team undertakes a process by which they question the integrity of each theory, consider the competing theories as explanations to why certain outcomes are achieved in similar and different settings and compare the stated theory with observed practice.[52]

3.11 Documenting and Reporting the Search Process

Detailed documentation and reporting of searches is essential for ensuring that the searches can be critiqued by peer reviewers and interested readers. As a general guide the standard of reporting should be sufficient for a reader to reproduce the search methods. As well as ensuring transparency of method, this level of reporting facilitates maintenance and update of subsequent reviews. The RAMESES publication standards for realist syntheses stipulate reporting: the sources searched, including bibliographic databases and any other sources; all search terms used (optimally including how the search terms were combined into a search strategy); the most recent date that searches were carried out; and dates of coverage.[2] These requirements are common to other types of systematic review reporting guidance e.g. the Cochrane Handbook for Systematic Reviews of Interventions,[53] the Collaboration for Environmental Evidence's Guidelines for Systematic Reviews in Environmental Management,[54] and the Centre for Reviews and Dissemination's Guidance for Undertaking Reviews in Health Care.[55] Further to the above, RAMESES stipulates that review authors should state and provide a rationale for any iterative searching e.g. when testing and refining programme theories.[2]

Use of Reporting Standards

Twenty-five of the 35 reviews in our sample cited the RAMESES publication standards for realist syntheses.[2] A further two reviews cited the RAMESES publication standards for meta-narrative reviews,[56] and one review cited the RAMESES protocol.[57] The remaining seven reviews[15,21-22,24,33,35,38] did not reference RAMESES or any other reporting standard e.g. PRISMA.[58] Twenty-two reviews reported a PRISMA flow diagram or adapted a PRISMA flow diagram but did not always attribute the PRISMA Statement to the diagram.[58]

Reporting of searching bibliographic databases

Searching bibliographic databases was the most frequently reported search method in our sample of realist reviews (n=33). The majority of such reports were broadly compliant with RAMESES.[2] At least one database was reported in all 33 reviews, although we cannot be certain that every database searched was reported in every case (see Table 3). Of these, 24 reviews reported search terms, either as a sample search strategy (n=12) or as illustrative search terms in tabular or list form (n=12). Four reviews went further and reported the bibliographic database search strategies for all databases searched.[15 17 41 47] Although this constitutes an exemplary approach, we acknowledge that this level of reporting may be constrained by publication word limits or reporting preferences of journal editors. (RAMESES guidance recognises that review authors should 'consider [the] specific requirements of the journal or other publication outlet).[2] Notably, two of these four reviews are UK Health Technology Assessment reports published in the NIHR journals monograph series,[41,47] with higher word count limits and greater scope for detail than standard journal publications.

The remaining five reviews which reported searching one or more bibliographic database did not report any details of the search terms. However, in some cases the reader was directed to a sibling study with additional detail about the searches.[28,59] This necessarily acknowledges the word count limitations of some journals although transparency might require that sibling studies with essential detail are available via open access, either through the journal site or through an open access institutional data repository.

The reporting of database coverage dates and justification for the date coverage chosen was variable across the reviews. RAMESES publication standards for realist syntheses require dates of coverage and dates last searched.[2] Ten reviews did not report the dates of coverage, six reported start dates only (i.e the historical cut-off date), four reported end dates only however fifteen reported both start and end dates in line with RAMESES standards.[2]

Limits to searches such as date or language limits can be described in the search methods section of the manuscript, and also clearly identified as search lines within a full database search strategy. In some reviews with multiple searches or search iterations it was unclear if a limit was applied to all searches throughout the review or only to selected searches.[27] Some papers indicated limits had been applied in some, but not all, databases,[42] whereas others did not contain detailed search data, implying that a stated limit was applied to all databases. To avoid mis-representing searches, careful attention should be paid when describing which search limits were used, to which stages of the search and for which database.

Reporting of non-bibliographic database searching

Several forms of non-bibliographic database searching were reported. Reporting was less detailed than for bibliographic database searching – in general, narrative detail of the overall approach was provided in the main text, but did not always include the step-by-step detail required for full transparency. In part, this may reflect a focus of the RAMESES publication standards on reporting relevant to bibliographic databases, e.g. search terms and limits.[2] However, this may mirror a broader trend in the reporting of what is typically described as 'supplementary searching' for other types of reviews – a comparable lack of detail when reporting non-bibliographic database searching has been observed in Cochrane reviews.[61]

Constraints of time and resources available for our review prevent describing and comparing in detail the reporting of each supplementary search method across all 35 reviews in our sample. Whitaker provided the most detailed report of supplementary searching,[47] which included step-by-step detail on:

- How lead authors were approached for details of associated reports;
- How sibling papers were identified using the PubMed related articles feature;
- Resource names, search dates and numbers of results retrieved for searches for grey literature;
- Google search terms, dates and numbers of results;
- Search dates and numbers of results for citation searches;
- Journals in which hand-searching was conducted.

This approach could be considered exemplary reporting. However, as noted above, this realist review is published within the NIHR journals monograph series with higher word count limits and more scope for reporting detail than a standard journal publication.[47] Reporting of non-bibliographic database searching in standard journals typically included lists of methods and/or sources searched rather than the full process undertaken, e.g. 'we searched for grey literature via websites, national guidance and professional publications' not identifying particular sources or how they were searched. However, we note room for improvement in such reporting, even given space limitations in print journals, as names of sources would be useful, and not prohibitively lengthy, even if step-by-step descriptive detail cannot be accommodated within the journal format.

For realist reviews, all available search methods can be used throughout the review within an iterative search process,[5] contrasting with the classic systematic review model where bibliographic database searches are conducted at the start of the review supplemented by other non-bibliographic database search approaches. We identified explicit mention of iterative searching in 10 reviews. Typically, this comprised a general statement that an iterative approach to searching was used to test and refine programme theories.[16,25,30,33,35,48] Gilmer reported including an advisory group of experts in an iterative search process by asking for feedback on the results of each stage of searching, which led to suggestions for additional searches.[27] Our personal experience confirms what we observed within reviews in our sample, namely that iterative searching is difficult to document and report in full, with implications for the transparency of realist reviews.[44] However, we contend that – although more labour intensive and demanding of limited journal space – transparent reporting of iterative searching – for the most part – remains possible.[47] In reporting a non-iterative approach to searching, Elliott (2016) reported that all items in RAMESES were followed *except* for iterative searching, as the initial searches 'obtained a large sample of literature…which we felt [provided] sufficient data.'[23] Although not an iterative search method *per se*, repeated mining of a large and broadly inclusive data-set offers iterative theory or evidence identification, as a valid alternative to repeated searches for new theories or studies.

4 DISCUSSION

4.1 Summary of Findings

Across the sample of 35 realist reviews, published within both health and non-health, we detected considerable variation in search methods and reporting. Diverse methods reflect the still-experimental nature of the realist synthesis approach, justifying our quest to identify alternative search methods beyond our own. Furthermore, this reflects the lack of explicit realist synthesis methods handbooks, with realist commentators focusing on an overall direction of travel rather than on specific detail. It could also reflect an inherent flexibility of approach to realist synthesis where standardisation is likely to be both unlikely and undesirable. The flexibility of the realist approach when carrying out literature searches is illustrated in a worked example in this journal.[60]

Similarities and differences between the "realist search" and the "systematic review search" were revealed at all levels of the sample, from the overall search process down to specific stages or techniques. In many cases, the realist search process could be characterised as essentially iterative, either stated explicitly or indicated implicitly within the narrative description of methods or accompanying search diagrams. Several reviews mirrored the 'big-bang' search process that characterises systematic reviews, where relevant

information is identified through a single upfront search, either within wider review objectives or for a specific realist component, and other features typical to systematic review methods were both used and documented.

4.2 Current practice of search methods

Searching for programme theories revealed perhaps the greatest variation in methods. Indeed, some reviews did not even include this as a formal search stage with programme theories being generated internally by the team or from serendipitously identified documents. The well-documented split within most fields of study between conceptual and empirical literature suggests the potential value of specific additional searches although methods for identification of programme theory need further development.

We found it particularly challenging to identify formal processes for searching to refine programme theories. Partly this may be attributable to the fact that this might be considered and described as an extension of the earlier search for programme theories. It might also reflect the fact that the review team iteratively returns to data previously identified from background or empirical searches rather than initiating further searches.

In contrast the search for empirical evidence most closely resembles the familiar search for studies modelled by the conventional systematic review. The number and types of sources used, search terms selected and methods harnessed when searching bibliographic databases differed little from corresponding searches for systematic reviews. Perhaps an exception lies with non-bibliographic database search techniques and the use of grey literature sources which are extensively used within realist syntheses, largely due to a need to identify more extensive evaluative literature, a wider range of study and publication types and examples of programmes currently in progress. Whether the configurative (interpretive) nature of realist syntheses opens up the possibility of more theoretical, purposive methods of sampling was ambivalent within the sample with a large proportion mirroring the comprehensive sampling of the conventional systematic review. We contend that even purposive approaches to sampling may require an underlying comprehensive search approach so that the sampling frame, from which included ‘cases’ are selected, reflects the true diversity and richness of relevant studies. Furthermore, we detected realist syntheses that did not fully engage with the systematic review tradition evidenced in a more discursive, less complete and less structured approach to description of methods.

4.3 Reporting of Search strategies

In comparison to limited available guidance material on specification of methods, reporting is well-catered for by the RAMESES reporting standards. However, even the three specific RAMESES reporting standards relating to the realist search do not acknowledge the full extent or variation of the multi-component searches as documented in our six-stage process. Furthermore, documentation of the search process did not always comply with the RAMESES reporting standards.[2] Seven of our sample of reviews did not reference RAMESES at all. Our sample shared the inadequacies of many systematic reviews in omitting important details of decisions made regarding limits, date cut-offs and types of included studies. The sample showed substantive variation in reporting of search strategies ranging from no detail, reporting of indicative key terms, documenting a single search strategy from one database or reproducing multiple search strategies. We contend that a search strategy should extend beyond the minimum requirements of RAMESES; not only including indicative terms used but routinely going beyond this to indicate the syntax and relationships between search terms. Furthermore, we highlight the enduring value of a PRISMA-type flow diagram in ensuring the transparency of the search process.[58]

In making a plea for more complete reporting of search strategies and approaches we acknowledge that multiple alternatives exist to achieve this including the provision of supplementary appendices or links to associated publications, protocols or full reports. Above all, we affirm a tension previously identified within qualitative evidence syntheses[62] namely that better synthesis science may require iterative and responsive search strategies. Accommodating iterative search strategies with fidelity may aggravate the challenge already posed by the need to document strategies with both transparency and clarity.[44] Developing and sharing good practice for efficiently documenting iterative searches during the review's lifecycle is encouraged.

4.4 Strengths and limitations of this study

This study was conducted by three experienced information professionals with extensive collective experience of supporting diverse realist syntheses as well as having documented diverse review types. The six-component realist search framework used for data extraction extended an early version from the originator of realist synthesis, supplemented by formulating the question and documenting and reporting the search process. Nevertheless, it was challenging to compartmentalise published written accounts of the search process within the framework; authors did not clearly delineate the different components nor did they use consistent labels when describing the search process. It was also challenging to decide on the

eligibility of included reviews, both in the degree to which they represented a full report of a realist search and in how to interpret publication within a single calendar year.

We sought to replicate as closely as possible, the search methods used in the original study by Berg & Nanavati.[4] As experienced information professionals we acknowledge the potential to improve on the original authors' published search strategies for identifying a test set of realist reviews. Our study required as unequivocal a sample of realist reviews as possible and so we relied on distinctive labels (e.g. realist review and realist synthesis) for positive identification. Even choosing this conservative strategy required subsequent exclusion of protocols and realist evaluations with a synthesis element. We further acknowledge that, given additional time and resources, we could have described and compared supplementary search methods across our sample. Future reviews and updates could make practice and innovation in supplementary search methods a focus for exploration.

Fulfilment of reporting requirements is a question of degree and is not easily reduced to binary judgements. We have not attempted to evaluate the quality or appropriateness of the search techniques used, focusing only on describing the procedures used. Interpretations of the written reports were achieved through consensus.

5 CONCLUSIONS

In assessing a sample of 35 realist reviews published within a single calendar year we have identified considerable variation and yet some areas of consensus. Sampling strategies were diffuse yet the comprehensive sampling strategy was also clearly detected in the majority of included reviews. The search for empirical evidence was the most systematically conducted and transparently reported searching stage, while searches for programme theory were conducted alongside or as part of more vaguely reported "background" or "scoping" searches, or coterminous with the search for empirical evidence. Reporting of searches to refine programme theories was even more sparse. We have suggested that it would be useful to differentiate between these search stages clearly when conducting and reporting searches for realist reviews. This might involve clearly describing the way in which the results of a single search were sifted for different stages of the review, rather than necessarily running multiple searches – although we do advocate that the latter approach offers unique benefits by harnessing diverse search approaches beyond the bibliographic database-led systematic review search for evidence.

Suggestions for practice

Conduct

- Consider conducting searches for programme theory separately to searches for evidence.
- Iterative approaches to mining reference libraries could be used in place of multiple searches.
- Grey literature sources might be particularly useful for programme theory development in addition to published sources.
- A comprehensive approach to searching for empirical evidence should not necessarily be rejected in favour of narrow sampling techniques, as this can provide rich data to draw from.
- Supplementary search methods should be considered at all stages of the review.

Reporting

- Searches to inform and refine the initial programme theory should be reported alongside searches for empirical evidence.
- Supplementary searches should be transparently reported alongside bibliographic database searches.
- Consistent approaches to reporting the 'realist search' could improve the readability and clarity of the reviews: this could be achieved using the featured six-part structure.

Operating outside prescribed standards for searching allows researchers to innovate and yet, at the same time, generates considerable uncertainty. In demonstrating a previously proposed six-component structure within which to frame the 'realist search' we seek to accommodate innovation while encouraging searchers to conduct and document essential ingredients of the realist method, as captured within Pawson's original template.[7] We look forward to the development and evaluation of advanced methods of study identification in support of realist synthesis.

In common with other types of literature review, reporting of searches was better for bibliographic database searches than for other search methods. The RAMESES reporting standards[2] do not currently distinguish between the different components of the realist search. As a consequence, a realist review team, supported by an information specialist unfamiliar with realist synthesis, may find it confusing to differentiate contrasting expectations of comprehensive searching for empirical studies from more

purposive and intuitive approaches in search for programme theory or mid-range theory. Structured reporting of the realist search process, according to the six-component framework that we recommend, holds the potential to ensure that the next literature survey of realist syntheses documents a clearer, more coherent and structurally consistent approach than was revealed by our survey. Potentially, improved reporting will improve the readability of realist synthesis reports and the clarity of review methods, further enhancing the credibility of the realist synthesis methodology.

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ORCID

Andrew Booth http://orcid.org/0000-0003-4808-3880

Simon Briscoe http://orcid.org/0000-0002-6982-4521

Judy Wright http://orcid.org/0000-0002-5239-0173

ABBREVIATIONS

ASSIA Applied Social Sciences Index & Abstracts

CINAHL Cumulative Index to Nursing and Allied Health Literature

DARE Database of Abstracts of Reviews of Effects

ERIC Education Resources Information Center

MEDLINE Medical Literature Analysis and Retrieval System Online

PRISMA Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RAMESES Realist And MEta-narrative Evidence Syntheses: Evolving Standards

SCI Science Citation Index

SSCI Social Sciences Citation Index

APPENDIX 1 – SEARCH STRATEGIES FOR EACH DATABASE AND NUMBER OF HITS RETRIEVED

Database: Cochrane Database of Systematic Reviews (CDSR)
Host: Cochrane Library
Data Parameters: Issue 7 of 12, July 2017
Date Searched: 12/7/2017
Searcher: SB
Hits: 0
Strategy:

1. ("realist systematic review*" or "realist review*" or "realist synthes*"):ti or ("realist systematic review*" or "realist review*" or "realist synthes*"):ab Publication Year from 2015 to 2017

Database: CINAHL
Host: EBSCO
Data Parameters: n/a
Date Searched: 12/7/2017
Searcher: SB
Hits: 85
Strategy:

1. TI (“realist systematic review*” or “realist review*” or “realist synthes*”) OR AB (“realist systematic review*” or “realist review*” or “realist synthes*”)

Notes: Date limited 2015 to current.

Database: DARE
Host: Centre for Reviews and Dissemination
Data Parameters: n/a
Date Searched: 12/7/2017
Searcher: SB
Hits: 0
Strategy:

1. (realist systematic review* or realist review* or realist synthes*) IN DARE FROM 2015 TO 2017

Notes: DARE was discontinued in March 2015 but is still searchable as an archive.

Database: Embase
Host: Ovid
Data Parameters: 1974 to 2017 July 11
Date Searched: 12/7/2017
Searcher: SB
Hits: 165

Strategy:

1. (“realist systematic review*” or “realist review*” or “realist synthes*”).tw
2. limit 1 to yr="2015 -Current"

Database: ERIC
Host: EBSCO
Data Parameters: n/a
Date Searched: 12/7/2017
Searcher: SB
Hits: 4
Strategy:

1. TI (“realist systematic review*” or “realist review*” or “realist synthes*”) OR AB (“realist systematic review*” or “realist review*” or “realist synthes*”)

Notes: Date limited 2015 to current.

Database: PsycINFO
Host: Ovid
Data Parameters: 1806 to July Week 1 2017
Date Searched: 12/7/2017
Searcher: SB
Hits: 54
Strategy:

1. (“realist systematic review*” or “realist review*” or “realist synthes*”).tw
2. limit 1 to yr="2015 -Current"

Database: ProQuest Dissertations & Theses A&I
Host: ProQuest
Data Parameters: After December 31 2014
Date Searched: 12/7/2017
Searcher: JW
Hits: 17
Strategy:

1. ti("realist systematic review*" OR "realist review*" OR "realist synthes*") OR ab("realist systematic review*" OR "realist review*" OR "realist synthes*")

Database: PubMed
Host: NLM
Data Parameters: 1966 to 2017 July 12
Date Searched: 12/7/2017
Searcher: AB
Hits: 187
Strategy:

1. “realist systematic review*” or “realist review*” or “realist synthes*”
2. limit 1 from 2015/01/01 to 2017/12/31

Database: Sociological Abstracts (1952 - current)
Host: ProQuest
Data Parameters: After December 31 2014
Date Searched: 12/7/2017
Searcher: JW
Hits: 7
Strategy

1. ti("realist systematic review*" OR "realist review*" OR "realist synthes*") OR ab("realist systematic review*" OR "realist review*" OR "realist synthes*")

Database: Social Services Abstracts (1979 - current)
Host: ProQuest
Data Parameters: After December 31 2014
Date Searched: 12/7/2017
Searcher: JW
Hits: 9
Strategy

1. ti("realist systematic review*" OR "realist review*" OR "realist synthes*") OR ab("realist systematic review*" OR "realist review*" OR "realist synthes*")

Database: Web of Science Core Collection
Host: Clarivate Analytics
Data Parameters: 2015 - 2017
Date Searched: 12/7/2017
Searcher: JW
Hits: 145**
Strategy

1. ("realist systematic review*" OR "realist review*" OR "realist synthes*") TOPIC search

Notes: Web of Science Core Collection search includes:

- Science Citation Index Expanded (SCI-EXPANDED) --1900-present
- Social Sciences Citation Index (SSCI) --1900-present
- Arts & Humanities Citation Index (A&HCI) --1975-present
- Conference Proceedings Citation Index- Science (CPCI-S) --1990-present
- Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH) --1990-present
- Emerging Sources Citation Index (ESCI) --2015-present

Numbers found per database are:
SCI = 114, SSCI = 121, A&H = 0, CPCI-S = 2, CPCI-SSH = 0, ESCI = 4

Table A1. Number of results per database and in total

Database	**Results**	**Google Scholar**
CDSR	0	
CINAHL	85	
DARE	0	
Embase	165	
ERIC	4	
PsycINFO	54	
ProQuest Dissertations & Theses	17	
PubMed	187	
Sociological Abstracts	7	
Web of Science Core Collection	145	
Total results	**664**	**1,064**
Duplicate results	559	982
Unique results	105	82
Total Records Screened		**187***

[* -See Figure 2 – PRISMA Flow Diagram]

APPENDIX 2 – DATA EXTRACTION FORM

Study ID

Question Formulation

Background Search

Search Approach

Search to develop programme theories

Overall description of Search Strategy

Search to refine programme theories

Search for Mid-Range Theories

Inclusion Criteria

Terms Used

Reported Limitations of Search Methods Used

Documentation provided

- List all supplementary search documentation (other than above)
- Use of Reporting Standards

Reviewer Comments

Follow up Methodology References

APPENDIX 3 – EXCLUDED STUDIES

Reference	Reason
Booth V, Harwood R, Hood V, Masud T, Logan P. Understanding the theoretical underpinning of the exercise component in a fall prevention programme for older adults with mild dementia: a realist review protocol. Systematic Reviews. 2016 Dec;5(1):119.	Protocol
Ellaway RH, O'Gorman L, Strasser R, et al. A critical hybrid realist-outcomes systematic review of relationships between medical education programmes and communities: BEME Guide No. 35. Medical Teacher. 2016 Mar 3;38(3):229-45.	Published online: 08 Dec 2015
Lhussier M, Carr SM, Forster N. A realist synthesis of the evidence on outreach programmes for health improvement of Traveller Communities. Journal of Public Health. 2015 Jul 30;38(2):e125-32.	Published online 2015 Jul 30.
Mitchell S, Bennett K, Morris A, Dale J. Palliative care services for children and young people: Realist review of the literature. Archives of Disease in Childhood. 2016;101:A305-A6.	Abstract
Pearson M, Brand SL, Quinn C, et al. Using realist review to inform intervention development: methodological illustration and conceptual platform for collaborative care in offender mental health. Implementation Science. 2015;10(1):1-12.	Published Online Sept 28th 2015
Pearson M, Chilton R, Wyatt K, et al. Implementing health promotion programmes in schools: a realist systematic review of research and experience in the United Kingdom. Implementation Science. 2015;10:1-20.	Published Online October 28th 2015
Yalamanchili S, Skordis-Worrall J, Blanchet K. Barriers to Initial Management of Major Trauma in Low & Middle Income Countries: A Realist Synthesis. British Journal of Surgery. 2016 Aug;103:208-.	Abstract

Highlights

What is already known

Realist syntheses are becoming increasingly prevalent but methods for searching ("realist searches") are poorly specified.

What is new

Realist searches require iterative methods that use different search approaches to support different components of the realist synthesis process.

This audit of descriptions of search components from published realist syntheses for a single calendar year reveals examples of consensus on candidate approaches for retrieval and reporting as well as instances of genuine innovation.

Potential impact for RSM readers outside the authors' field

As realist syntheses start to populate subject fields where the systematic review convention has not previously gained traction it will be helpful for researchers in those fields to be exposed to information retrieval methods that can offer a systematic approach to study identification.

This paper offers a framework for planning, reporting and evaluating future realist searches from across multiple subject fields in an ongoing quest to improve standards of conduct and reporting.

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